



Outline

1. Purpose
2. Model overview
3. Current limitations
4. Bicycle usage survey

■ ■ ■ ■ | Bicycle Switching Model 2

Purpose

CMAQ funds improvements using performance-based criteria

Problem

- Current spreadsheet tool is simplistic and based on old data
- Regional travel demand model is too coarse for predicting bicycle demand at the desired level of sensitivity

Solution

- New tool with more sensitivity to factors affecting cycling use
- Re-introduce variability to each day's mode choice decision

■ ■ ■ ■ | Bicycle Switching Model - Purpose 3

Model overview – Final outputs

Auto trips eliminated (due to usage of proposed bicycle amenities)



Results in reduction in VMT



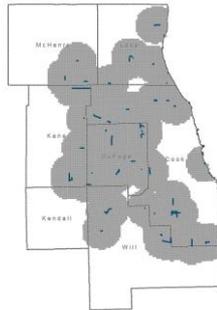
Yielding air quality benefits

Model overview – Main analysis components

1. Identify trips that may be affected by the facility improvement
2. Determine the difference in travel costs due to the improvement
3. Estimate the probability of an auto trip switching to bicycle mode

Model overview – Identify Trips

- Locate bicycle projects
 - 49 CMAQ proposals
- Create a 5-mile buffer for each project to identify area of impact
- Get trips from Activity-Based model that begin and end within a project buffer



Model overview – Determine travel costs

Generate routes between O-D pairs and summarize data for each route

- Auto routes based on shortest time cost
- Bike routes based on cost that is function of length and bicycle level-of-service (BLOS)

Model overview – Calculating Bicycle Level-of-Service

- BLOS is employed in highway capacity analysis to grade a road/path segment's perceived quality for bicycling based on measurable features of the facility
- CMAP calculated BLOS scores for the region using the Urban Street Segments methodology in Chapter 17 of the 2010 Highway Capacity Manual (using a 2012 IRIS dataset)

Model overview – Calculating Bicycle Level-of-Service

- Traffic volume
- Percentage of trucks
- Pavement condition
- Number of lanes
- Lane Width
- Presence of a bike lane and/or paved shoulder
- Speed limit
- On-street parking utilization



What about trails?

Model overview – Route summarization

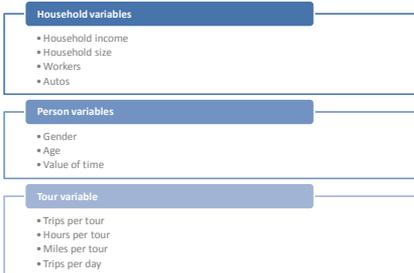
- Generate paths for each unique O-D pair

- Summarize data for base and build scenarios
 - Average BLOS score
 - Miles stratified by BLOS categories (A-F)
 - Miles stratified by 5 mph speed limit increments

Model overview – Switching model

1. Estimate switching probability based on household, person and tour characteristics
2. Apply modal penalties and weights
3. Incorporate weather variability into modal cost difference
4. Tabulate modal shifts and report results

Model overview – Estimating switching probability



Model overview – Tabulate modal shift

- Summarize the switch to bike

Mode Used	Switch To Bike (base)	Switch To Bike (build)	COUNT	PERCENT
Auto	0	0	5,407,834	99.13056721
Auto	0	1	110	0.002018267
Auto	1	0	23	0.000422001
Auto	1	1	477,295	0.866992525

Model overview – Model outputs

Description	Zone	Annual Auto Trips Eliminated	Annual VMT Eliminated
43rd St Access Bridge to Lakeland Trail	725	781	2,241
Milwaukee and Lake Av Multi-use Path	468	1,430	3,220
Old Orchard Rd from Harms Rd to Woods Dr	522	71	5
US 14/Northwood Way from Knapp St to Lake Zurich Rd	962	294	723
Sycamore Av, Wash Av and Unmarked Street Bike Lanes	381	51	146
Chestnut Av Multi-Use Path	471	61	76
Golf Rd Path from Roosevelt Blv to Ring Rd	427	152	356
E. 16/ving Park Rd from Schaumburg Rd to Park Blv	323	183	356
Flag Creek Bicycle Corridor	619	1,237	4,247
138th Av Trail Connection	717	2,393	7,941
Ridgeland Av from College Dr to 139th St	702	183	729
Bike to Metra	796	821	2,698
North Aurora Rd Underpass at CNE/NE	1318	274	960

Current Limitations

Network data

- Applied Urban Streets method throughout, regardless of roadway type
- Use of default values in BLOS calculations
- BIS project data – planning level data, not intended for routing

Model application

- Does not evaluate latent demand
- No empirical validation – need to survey
- Not a routing tool – does not assign bike trips to the network
 - Cannot answer the question: “How many people use this facility?”

Useful as planning/scoring tool, but not to make investment decisions

Bicycle usage survey

Currently gathering survey data to improve the bicycle switching model:

<https://cmapbicycleusage.metroquest.com>
